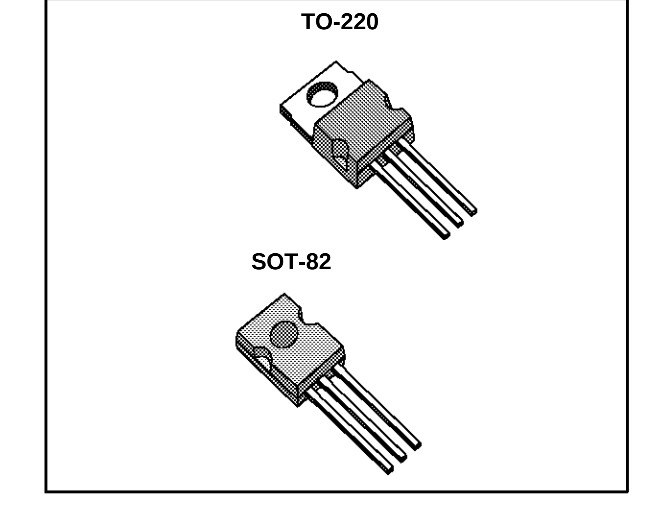



# L2605
# L2685-L2610

## LOW DROPOUT VOLTAGE REGULATORS

- OUTPUT VOLTAGE OF 5, 8.5 AND 10 V
- OUTPUT CURRENT UP TO 500 mA
- NO EXTERNAL COMPONENTS
- LOW DROP OUT VOLTAGE
- OVERVOLTAGE PROTECTION (± 100V)
- REVERSE VOLTAGE PROTECTION
- SHORT CIRCUIT PROTECTION
- CURRENT LIMITING
- THERMAL SHUTDOWN



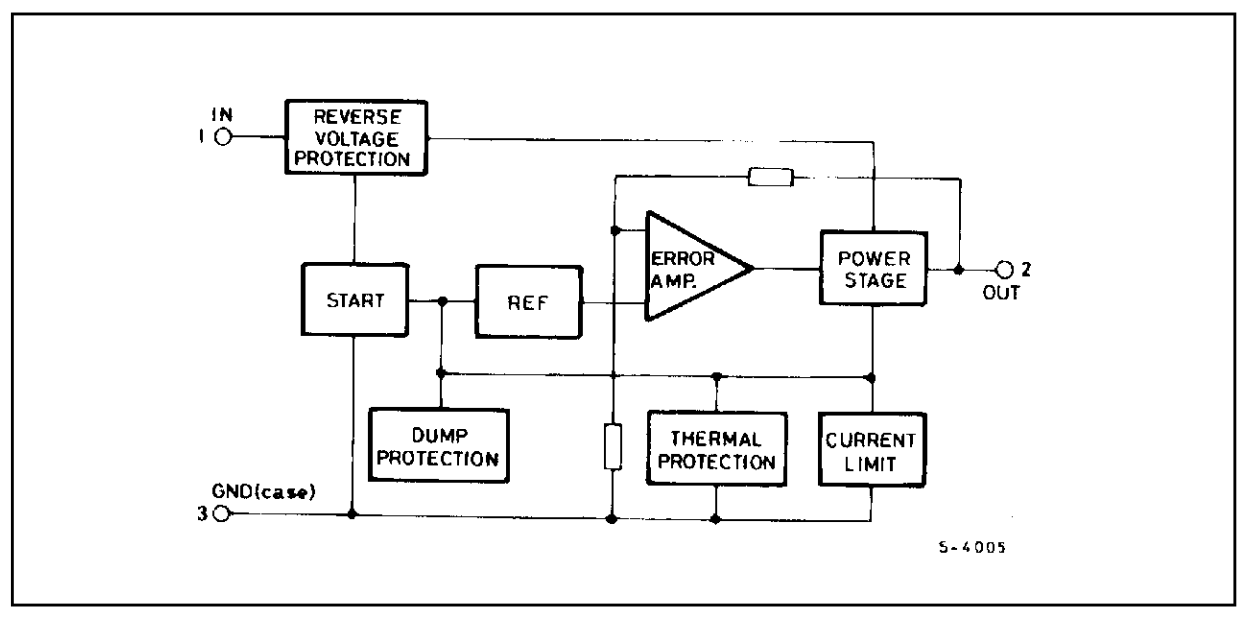

| Order codes | | Output Voltage |
|---|---|---|
| TO-220 | SOT-82 | |
| L2605V | L2605X | 5 V |
| L2685V | L2685X | 8.5 V |
| L2610V | L2610X | 10 V |

### DESCRIPTION

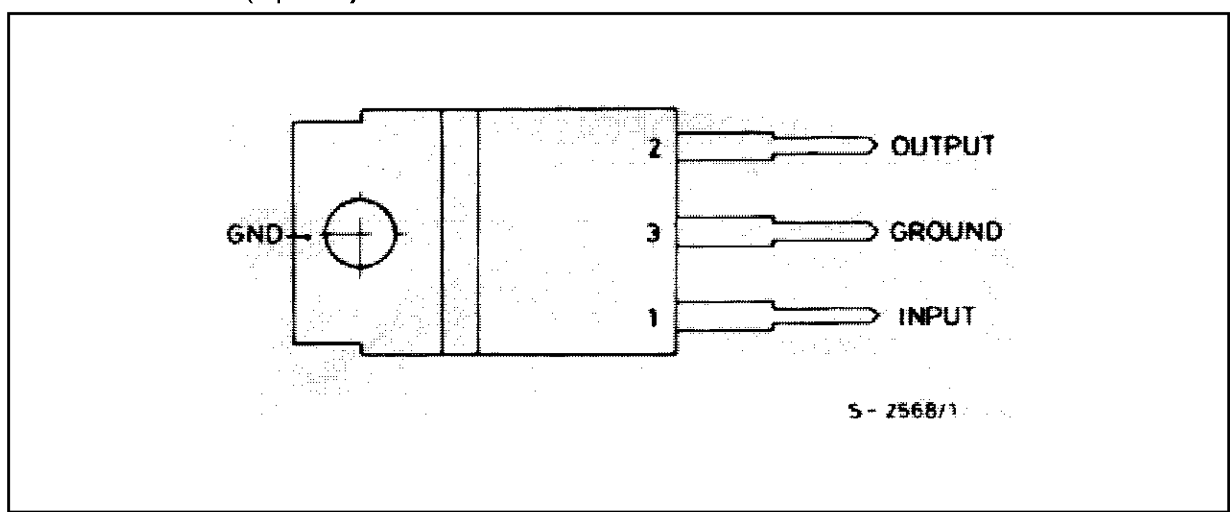
The L2600 series og three terminal positive regulators is specially designed to stabilize power supplies car instrumentation in vehicles with 12V battery. Available with output voltages equal to 5V, 8.5 V, 10V, they can supply an output current to 500mA.

These devices are protected against load dump and field decay transients (±100V), reverse battery, short circuit and thermal overload.

### BLOCK DIAGRAM



**PIN CONNECTION** (top view)



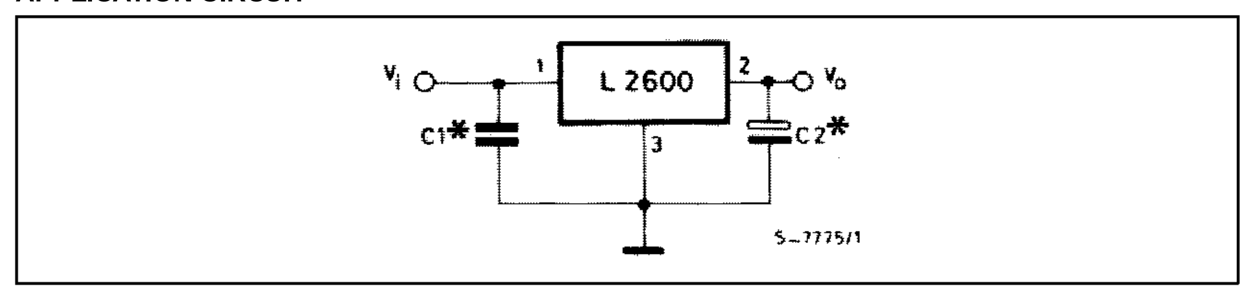

## ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_i$ | DC Input Voltage<br>DC Input Reverse Voltage<br>Transient Input Overvoltage:<br>Load Dump:<br>5ms ≤ $t_{rise}$ ≤ 10ms<br>$\tau_f$ Fall Time Costant = 100ms,<br>$R_{source}$ ≥ 0.5 Ω<br>Field Decay:<br>5ms ≤ $t_{fall}$ ≤ 10ms<br>$\tau_r$ Rise Time Costant = 33ms,<br>$R_{source}$ ≥ 10Ω | 35<br>-28<br><br>+ 100<br><br><br><br>- 100 | V<br>V<br><br>V<br><br><br><br>V |
| $P_D$ | Power Dissipation | Internally Limited | |
| $T_j$, $T_{stg}$ | Junction and Storage Temperature Range | - 55 to 150 | °C |

## THERMAL DATA

| Symbol | Parameter | | SOT-82 | TO-220 |
|---|---|---|---|---|
| $R_{th\text{-}j\text{-}case}$ | Thermal resistance junction-case | Max | 8 °C/W | 4°C/W |
| $R_{th\text{-}j\text{-}amb}$ | Thermal resistance junction-ambient | Max | 100 °C/W | 75 °C/W |

## APPLICATION CIRCUIT




(*) **Note** : $C_1$ and $C_2$ are only needed if the load capacitance exceeds 1000 pF, Recommended values are $C_1$ = 0.1 µF and C2 ≥ 100 µF.

**ELECTRICAL CHARACTERISTICS** ($T_j$ = 25 °C, $V_i$ = 14V, unless otherwise specified)

| Symbol | Parameter | Test Condition | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $V_o$ | Output Voltage | $I_o$ = 500 mA | $V_i$ = 12 to 16 V (L2605)<br>$V_i$ = 12 to 16 V (L2685)<br>$V_i$ = 12 to 16 V (L2610 | 4.80<br>8.15<br>9.60 | 5.00<br>8.50<br>10.00• | 5.20<br>8.85<br>10.40 | V |
| $V_i$ | Operating Input Voltage | See Note (*) | | | | 28 | V |
| $\frac{\Delta V_o}{V_o}$ | Line Regulation | $I_o$ = 50 mA | $V_i$ = 12 to 20 V | | 2 | 8 | mV/V |
| | Load Regulation | $V_i$ = 14 V | $I_o$ = 50 to 500 mA | | 4 | 9 | mV/V |
| $\Delta V_{i-o}$ | Dropout Voltage | $I_o$ = 500 mA | | | | 1.9 | V |
| $I_d$ | Quiescent Current | $I_o$ = 50 mA | | | 20 | 45 | mA |
| $\frac{\Delta V_o}{\Delta T}$ | Output Voltage Drift | $I_o$ = 50 mA<br>$V_i$ = 14 V | $T_{amb}$ = - 12 to 80 °C | | - 1 | | mV/°C |
| $I_{sc}$ | Output Short Circuit Current | | | | 1.1 | 1.8 | A |
| SVR | Supply Voltage Rejection | $V_i$ = 16<br>f = 100 Hz | $V_i$ = 2 V<br>$I_o$ = 500 mA | | 60 | | dB |
| $R_o$ | Output Resistance | $I_o$ = 500 mA | | | 0.05 | | Ω |
| $e_N$ | Output Noise Voltage | BW = 100 Hz to 10 KHz | | | 20 | | μV |

(*) **Note**: For DC innput voltage 28 V <$V_i$ <35 V the device is not operating

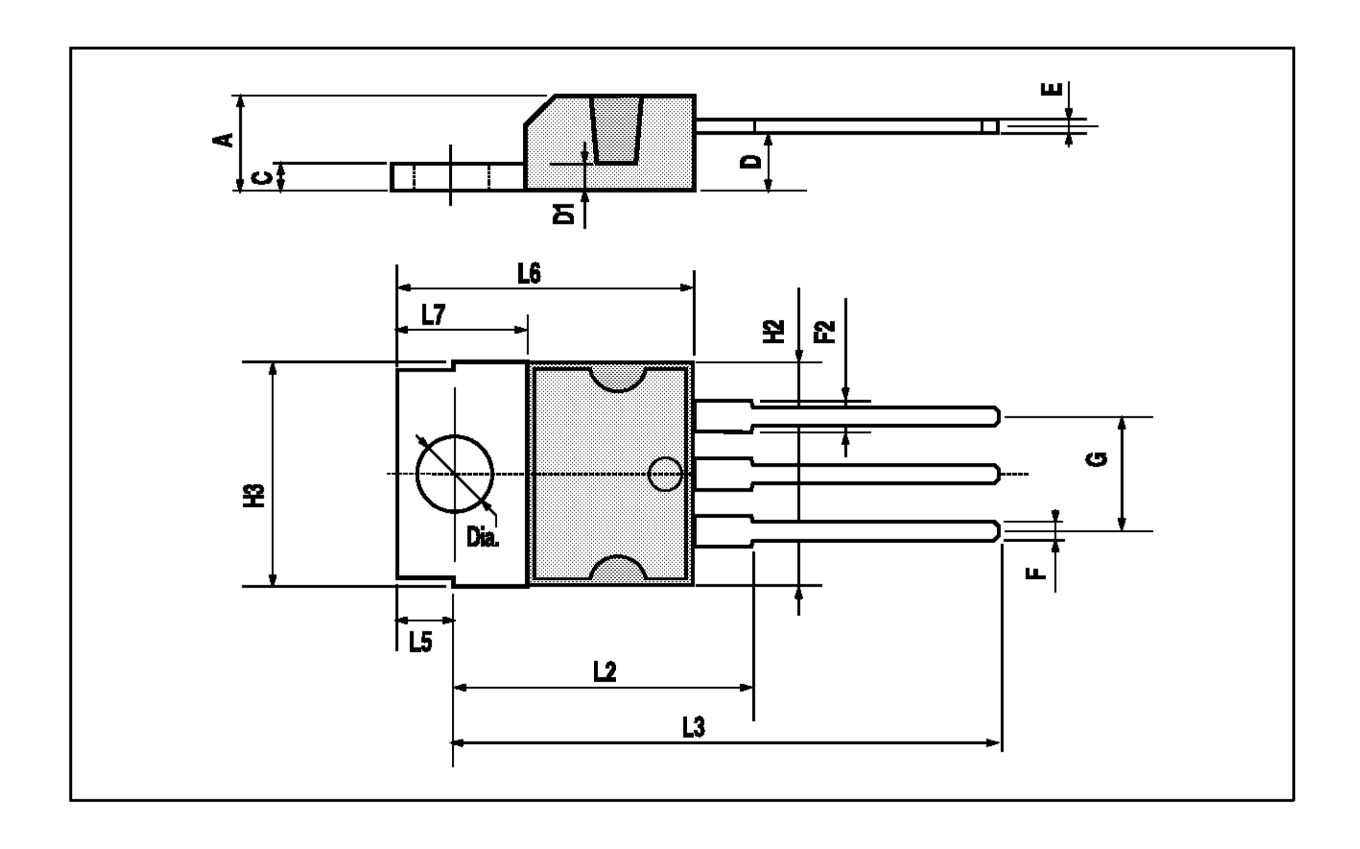
**ELECTRICAL CHARACTERISTICS** (- 40 ≤ $T_j$ ≤ 125 °C (note 2), $V_i$ = 14 V, unless otherwise specified**)**

| Symbol | Parameter | Test Condition s | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $V_o$ | Output Voltage | $I_o$ = 500 mA | $V_i$ = 12.5 to 16 V (L2605)<br>$V_i$ = 12.5 to 16 V (L2685)<br>$V_i$ = 12.5 to 16 V 2610) | 4.70<br>8.00<br>9.40 | 5.00<br>8.50<br>10.00 | 5.30<br>9.00<br>10.60 | V |
| $V_i$ | Operating Input Voltage | See Note (°) | | | | 26 | V |
| $\frac{\Delta V_o}{V_o}$ | Line Regulation | $I_o$ = 50 mA | $V_i$ = 12.5 to 20 V | | 3 | 12 | mV/V |
| | Load Regulation | $V_i$ = 14 V | $I_o$ = 50 to 500 mA, | 5 | 13 | mV/V | |
| $\Delta V_{i-o}$ | Dropout Voltage | $I_o$ = 500 mA | | | | 2.5 | V |
| $I_d$ | Quiescent Current | $I_o$ = 50 mA | | | 29 | 65 | mA |
| $I_{sc}$ | Output Short Circuit Current | | | | 1.1 | 2.1 | A |

**Notes**: (°). For a DC input voltage 26 V < Vi < 35 V the device is not operating.
2. The limits are guarandeed by design correlation and statistical control on production samples over the indicated temperature and supply voltage ranges.

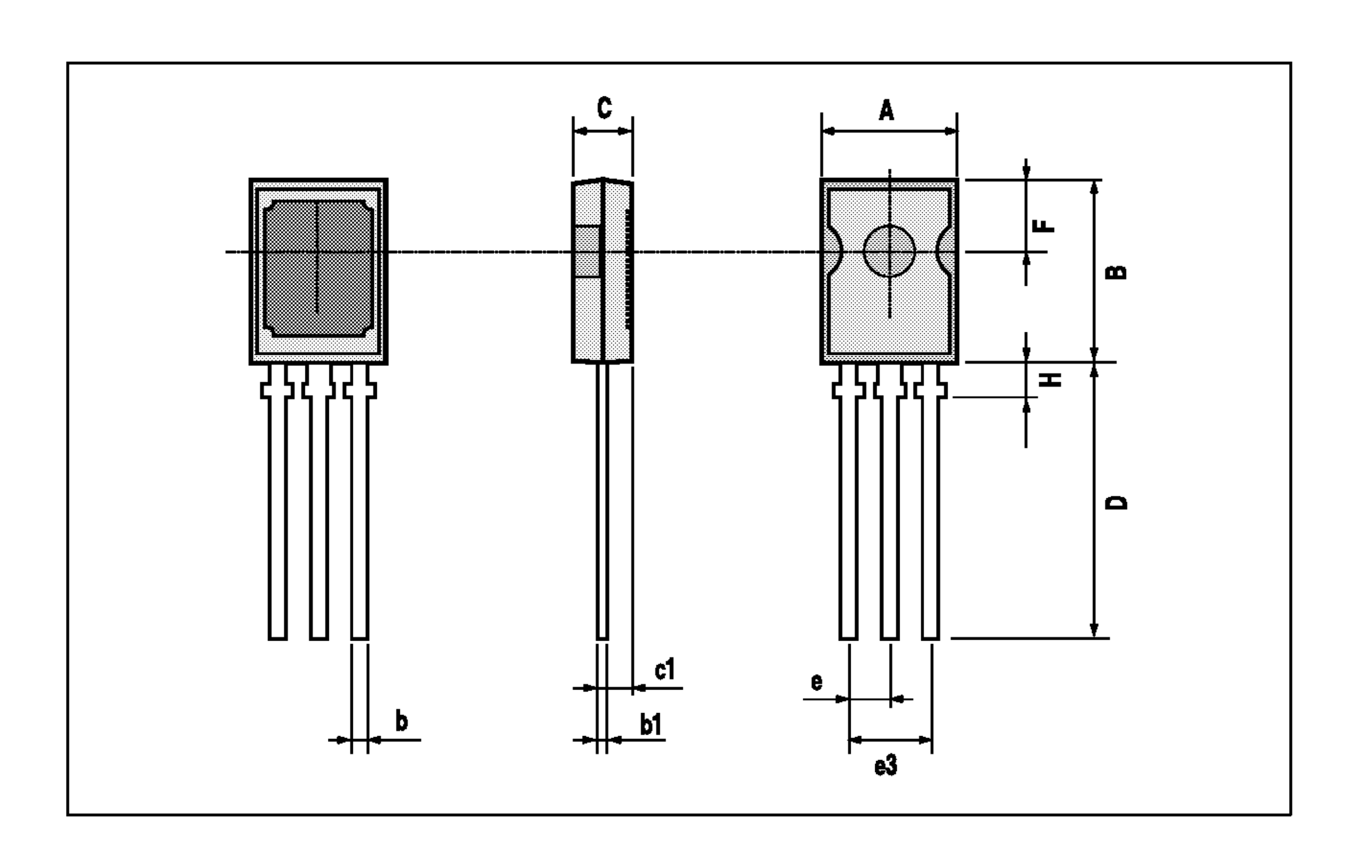
## TO220 PACKAGE MECHANICAL DATA

| DIM. | mm | | | inch | | |
|---|---|---|---|---|---|---|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | | | 4.8 | | | 0.189 |
| C | | | 1.37 | | | 0.054 |
| D | 2.4 | | 2.8 | 0.094 | | 0.110 |
| D1 | 1.2 | | 1.35 | 0.047 | | 0.053 |
| E | 0.35 | | 0.55 | 0.014 | | 0.022 |
| F | 0.8 | | 1.05 | 0.031 | | 0.041 |
| F2 | 1.15 | | 1.4 | 0.045 | | 0.055 |
| G | 4.95 | 5.08 | 5.21 | 0.195 | 0.200 | 0.205 |
| H2 | | | 10.4 | | | 0.409 |
| H3 | 10.05 | | 10.4 | 0.396 | | 0.409 |
| L2 | | 16.2 | | | 0.638 | |
| L3 | 26.3 | 26.7 | 27.1 | 1.035 | 1.051 | 1.067 |
| L5 | 2.6 | | 3 | 0.102 | | 0.118 |
| L6 | 15.1 | | 15.8 | 0.594 | | 0.622 |
| L7 | 6 | | 6.6 | 0.236 | | 0.260 |
| Dia | 3.65 | | 3.85 | 0.144 | | 0.152 |



## SOT82 PACKAGE MECHANICAL DATA

| DIM. | mm | | | inch | | |
|---|---|---|---|---|---|---|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 7.4 | | 7.8 | 0.291 | | 0.307 |
| B | 10.5 | | 10.8 | 0.413 | | 0.425 |
| b | 0.7 | | 0.9 | 0.028 | | 0.035 |
| b1 | 0.49 | | 0.75 | 0.019 | | 0.030 |
| C | 2.4 | | 2.7 | 0.094 | | 0.106 |
| c1 | | 1.2 | | | 0.047 | |
| D | | 15.7 | | | 0.618 | |
| e | | 2.2 | | | 0.087 | |
| e3 | | 4.4 | | | 0.173 | |
| F | | 3.8 | | | 0.150 | |
| H | | | 2.54 | | 0.100 | |




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